

## 5 A low drop positive voltage regulator adjustable

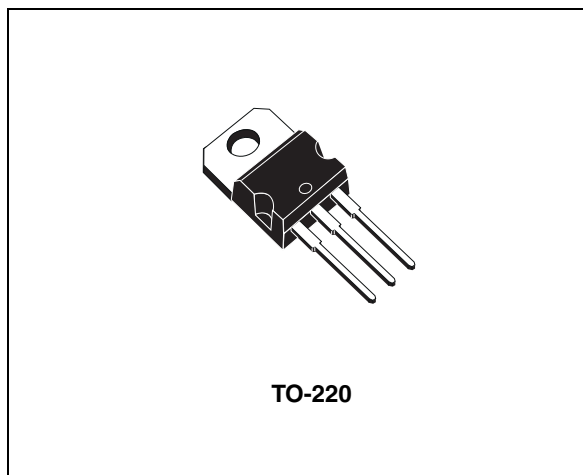
### Features

- Typical dropout 1.3 V (at 5 A)
- Three terminal adjustable output voltage
- Guaranteed output current up to 5 A
- Output tolerance  $\pm 1\%$  at 25 °C and  $\pm 2\%$  in full temperature range
- Internal power and thermal limit
- Wide operating temperature range -40 °C to 125 °C
- Package available: TO-220
- Pinout compatibility with standard adjustable VREG

### Description

The LD1084XX is a low drop voltage regulator able to provide up to 5 A of output current. Dropout is guaranteed at a maximum of 1.5 V at the maximum output current, decreasing at lower loads. The LD1084XX is pin to pin compatible with the older 3-terminal adjustable regulators, but has better performances in term of drop and output tolerance.

A 2.85 V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1084XX quiescent current flows into the load, so increase efficiency. Only a 10  $\mu$ F minimum capacitor is need for stability.



The device is supplied in TO-220. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 1\%$  at 25 °C.

**Table 1. Device summary**

Order code	Output voltage
LD1084V	Adjustable

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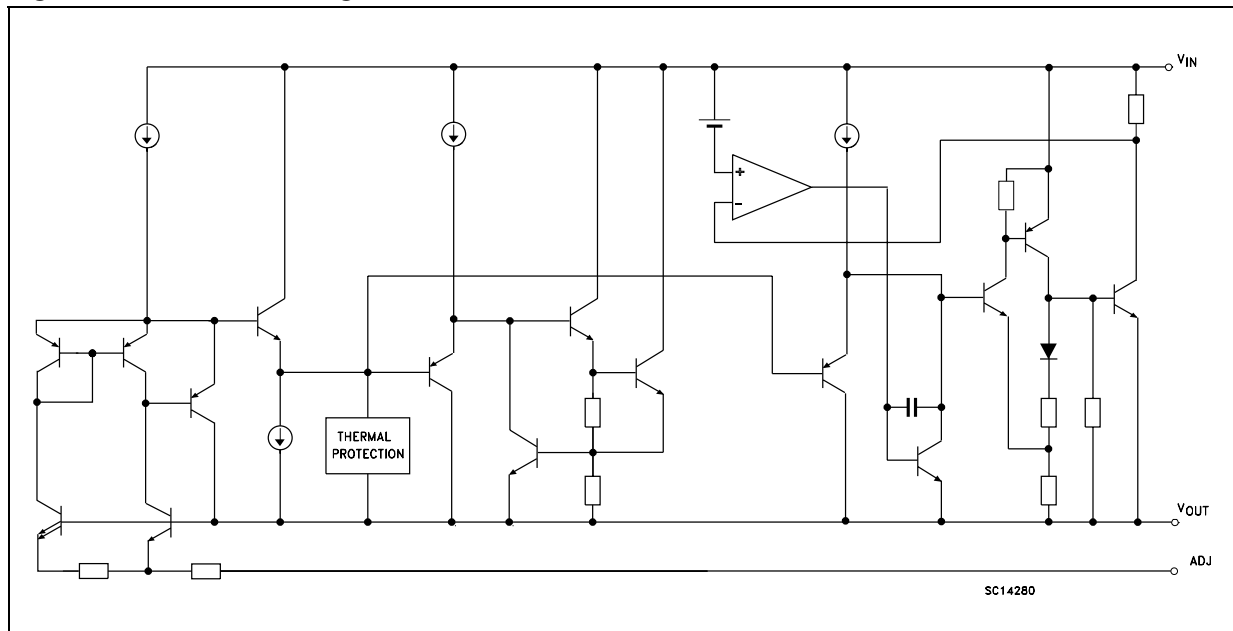
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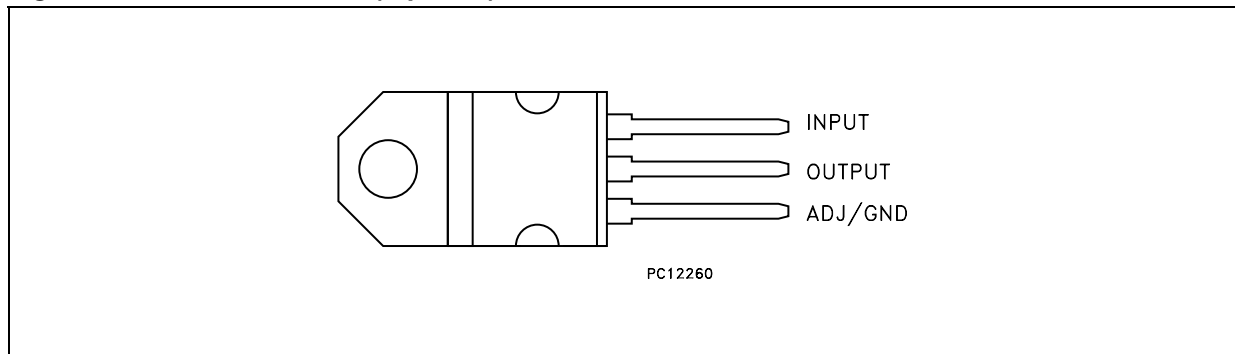
# 1 Diagram

Figure 1. Schematic diagram



## 2 Pin configuration

Figure 2. Pin connections (top view)



### 3 Maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_I$	DC input voltage	30	V
$I_O$	Output current	Internally limited	mA
$P_D$	Power dissipation	Internally limited	mW
$T_{STG}$	Storage temperature range	-55 to +150	°C
$T_{OP}$	Operating junction temperature range	-40 to +125	°C

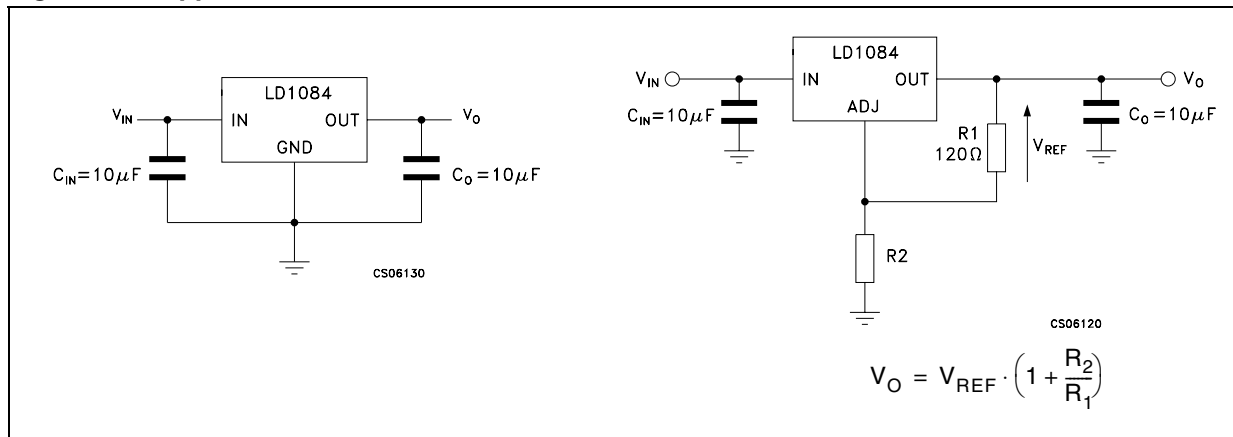
*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.*

**Table 3. Thermal data**

Symbol	Parameter	TO-220	Unit
$R_{thJC}$	Thermal resistance junction-case	3	°C/W
$R_{thJA}$	Thermal resistance junction-ambient	50	°C/W

## 4 Schematic application

Figure 3. Application circuit



## 5 Electrical characteristics

$V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 4. Electrical characteristics of LD1084XX**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_O$	Output voltage <sup>(1)</sup>	$I_O = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$	1.237	1.25	1.263	V
		$I_O = 10\text{ mA to }3\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$	1.225	1.25	1.275	V
$\Delta V_O$	Line regulation	$I_O = 10\text{ mA}$ , $V_I = 2.85\text{ to }16.5\text{ V}$ , $T_J = 25^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{ mA}$ , $V_I = 2.85\text{ to }16.5\text{ V}$		0.035	0.2	%
$\Delta V_O$	Load regulation	$I_O = 10\text{ mA to }5\text{ A}$ , $T_J = 25^\circ\text{C}$		0.1	0.3	%
		$I_O = 0\text{ to }5\text{ A}$		0.2	0.4	%
$V_d$	Dropout voltage	$I_O = 5\text{ A}$		1.3	1.5	V
$I_{O(\min)}$	Minimum load current	$V_I = 30\text{ V}$		3	10	mA
$I_{sc}$	Short circuit current	$V_I - V_O = 5\text{ V}$	5.5	6.5		A
		$V_I - V_O = 25\text{ V}$	0.5	0.7		A
	Thermal regulation	$T_A = 25^\circ\text{C}$ , 30ms pulse		0.003	0.015	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $C_{ADJ} = 25\text{ }\mu\text{F}$ , $I_O = 5\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$	60	72		dB
$I_{ADJ}$	Adjust pin current	$V_I = 4.25\text{ V}$ , $I_O = 10\text{ mA}$		55	120	$\mu\text{A}$
$\Delta I_{ADJ}$	Adjust pin current change <sup>(1)</sup>	$I_O = 10\text{ mA to }5\text{ A}$ , $V_I = 2.85\text{ to }16.5\text{ V}$		0.2	5	$\mu\text{A}$
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125^\circ\text{C}$ , 1000Hrs		0.5		%

1. See short-circuit current curve for available output current at fixed dropout.

# 6 Typical application

Unless otherwise specified  $T_J = 25\text{ }^{\circ}\text{C}$ ,  $C_I = 10\text{ }\mu\text{F}$  (tant.),  $C_O = 22\text{ }\mu\text{F}$  (tant.)

Figure 4. Short circuit current vs. dropout voltage

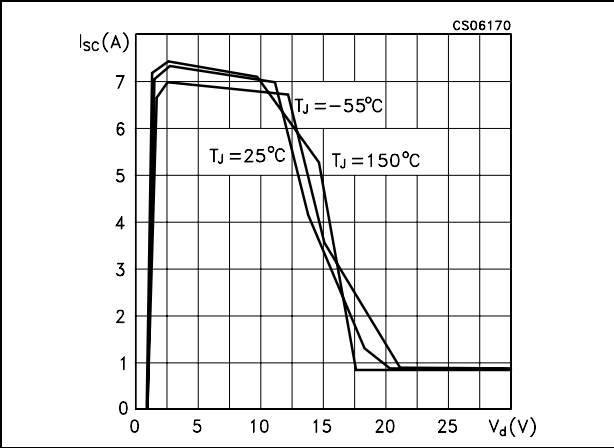


Figure 5. Line regulation vs. temperature

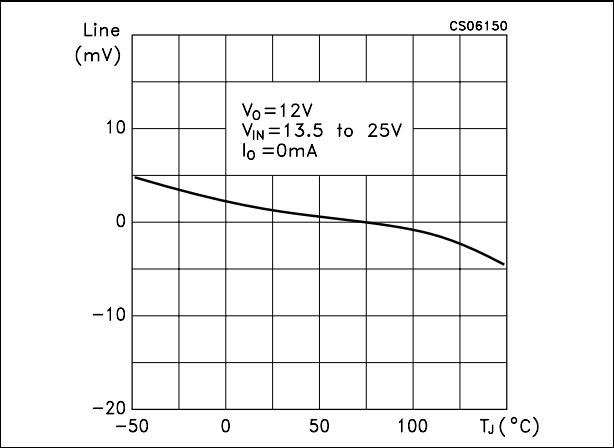


Figure 6. Quiescent current vs. temperature

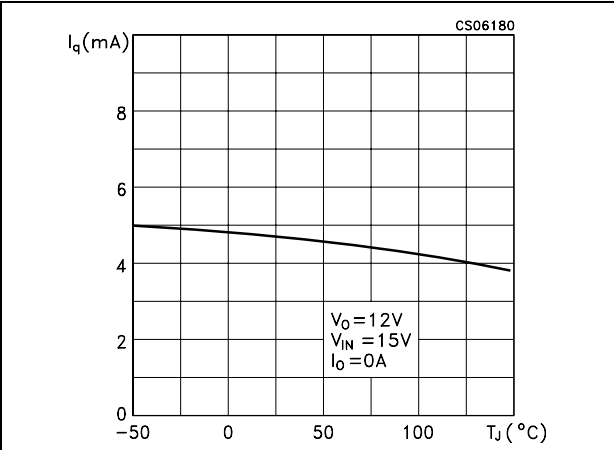


Figure 7. Output voltage vs. temperature

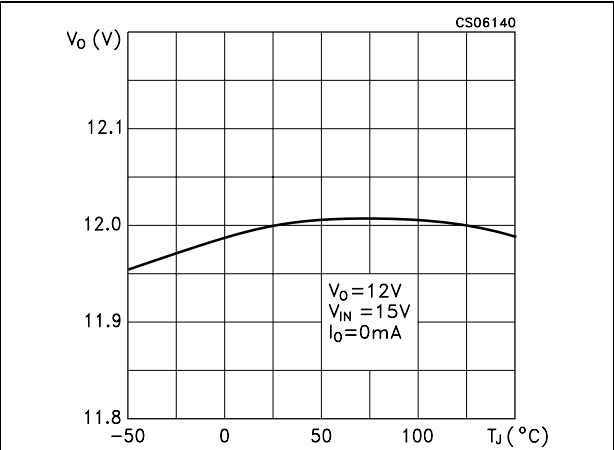


Figure 8. Load regulation vs. temperature

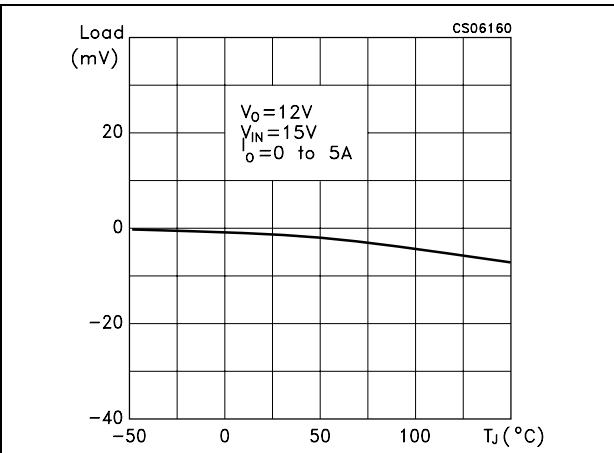


Figure 9. Quiescent current vs. output voltage

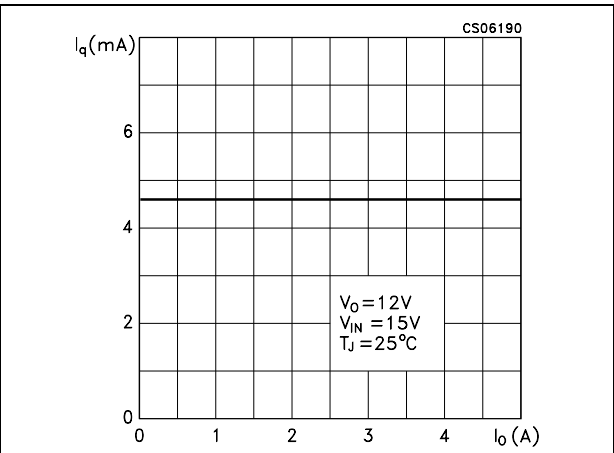




Figure 10. Quiescent current vs. input voltage Figure 11. Dropout voltage vs. output current

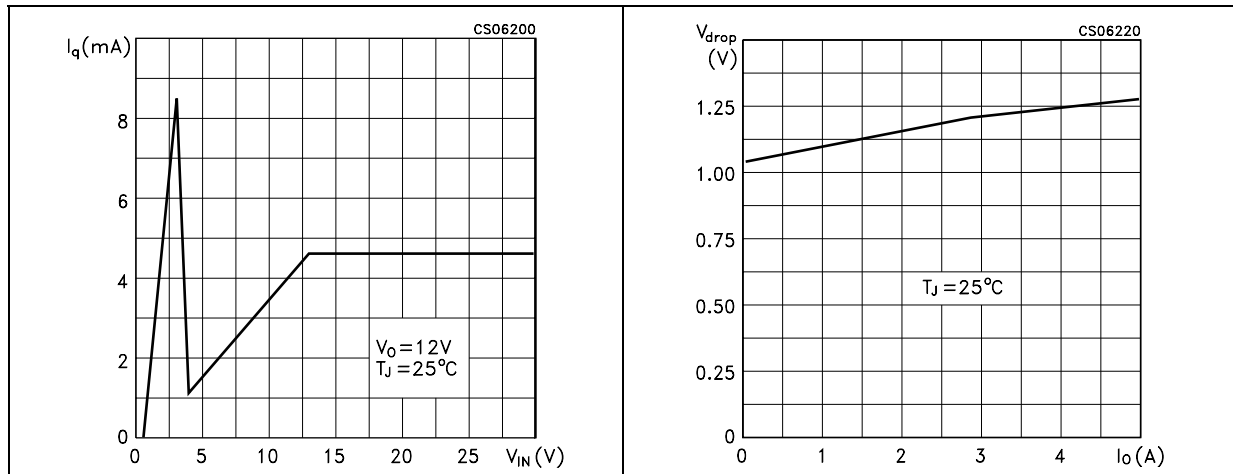


Figure 12. Supply voltage rejection vs. output current Figure 13. Dropout voltage vs. temperature

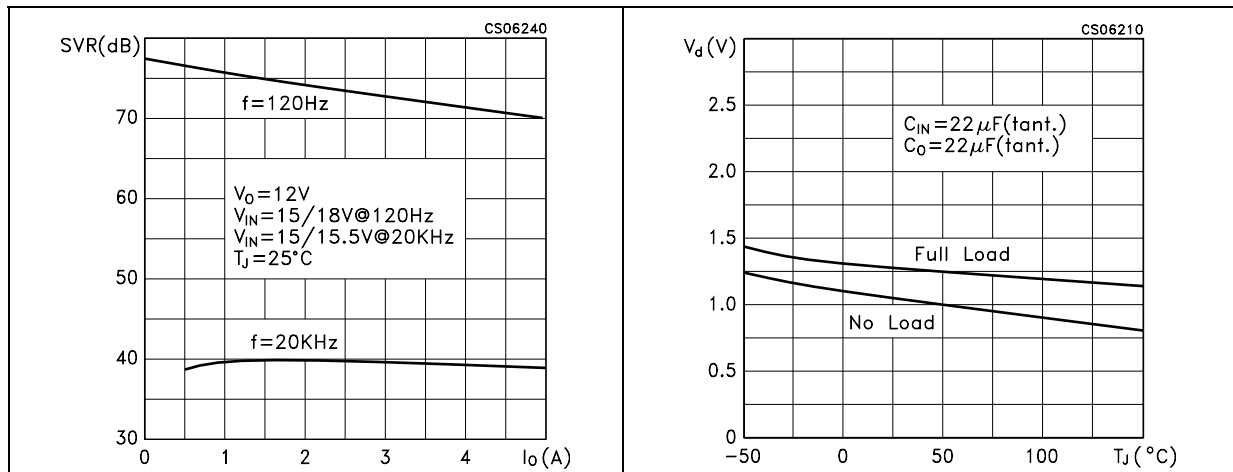


Figure 14. Supply voltage rejection vs. temperature

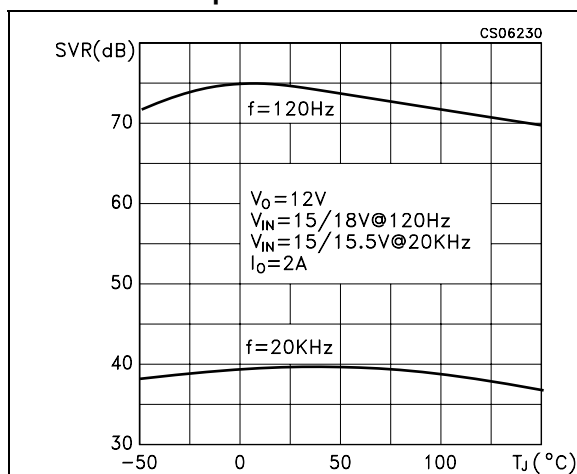


Figure 15. Supply voltage rejection vs. frequency

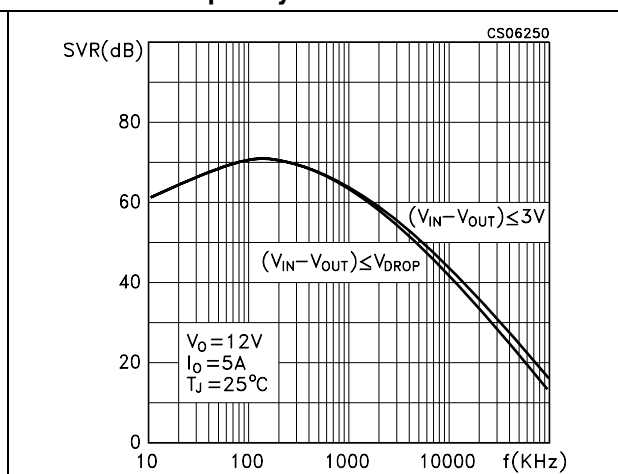


Figure 16. Adjust pin current vs. output current

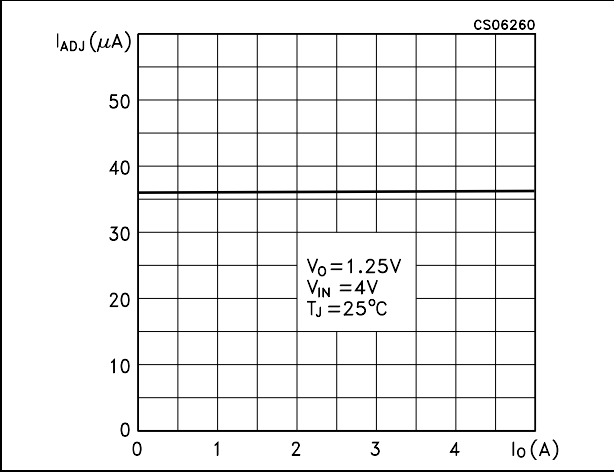


Figure 17. Reference voltage vs. temperature

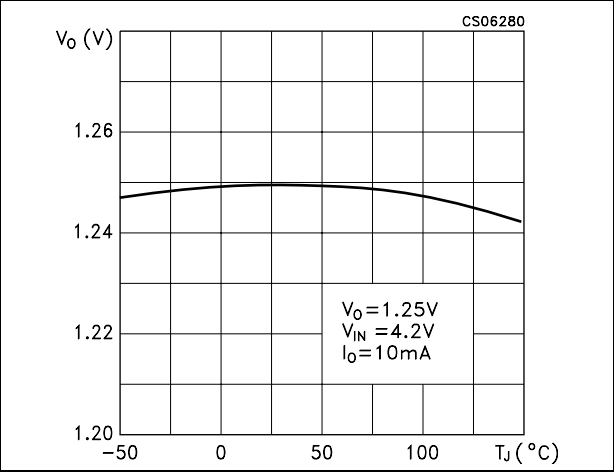


Figure 18. Load regulation vs. temperature

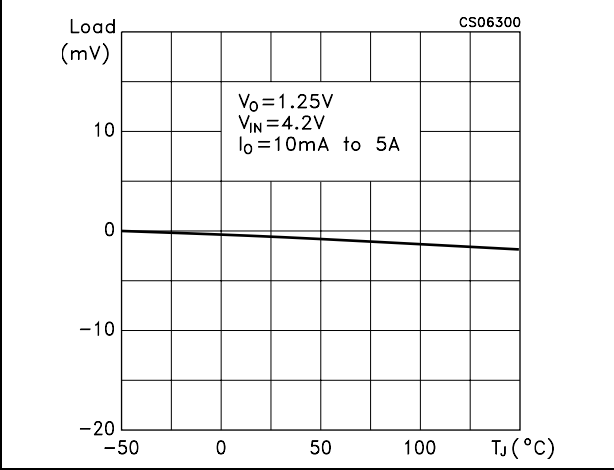


Figure 19. Adjust pin current vs. temperature

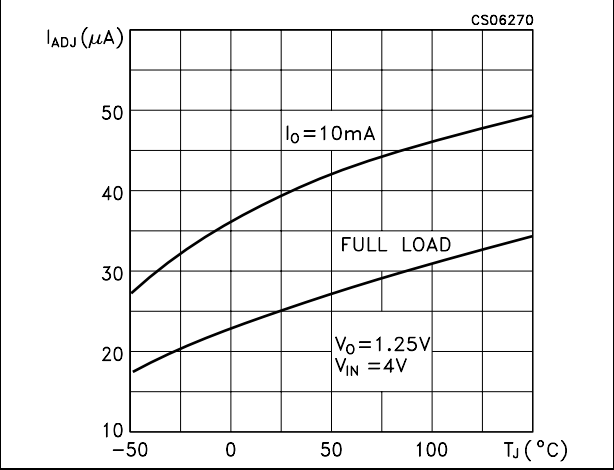


Figure 20. Line regulation vs. temperature

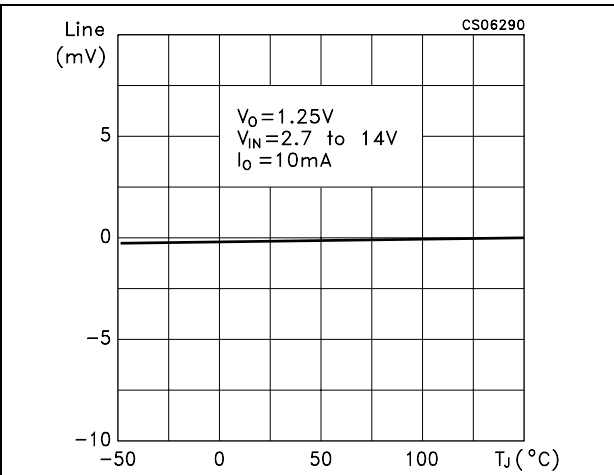


Figure 21. Minimum load current vs. temperature

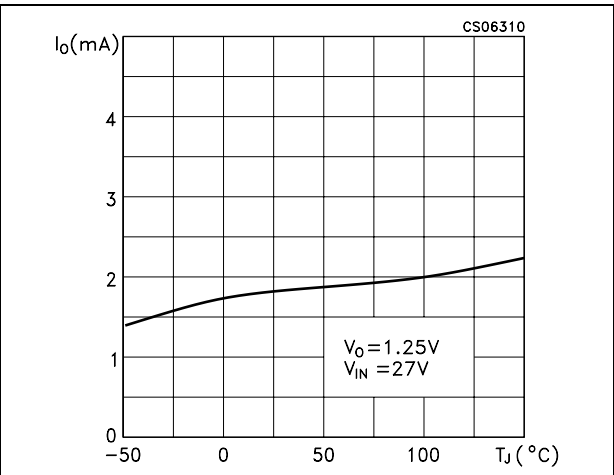


Figure 22. Supply voltage rejection vs. temperature

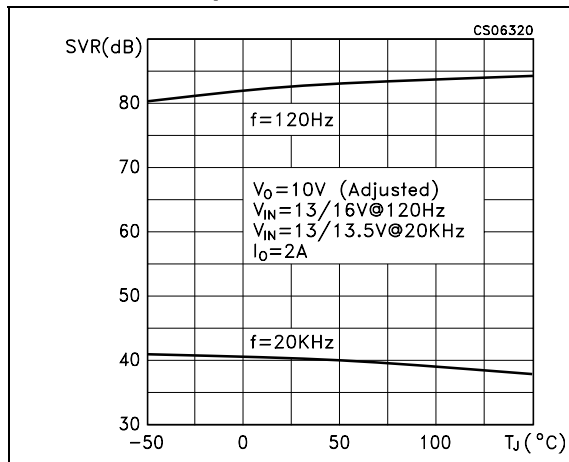


Figure 23. Supply voltage rejection vs. frequency

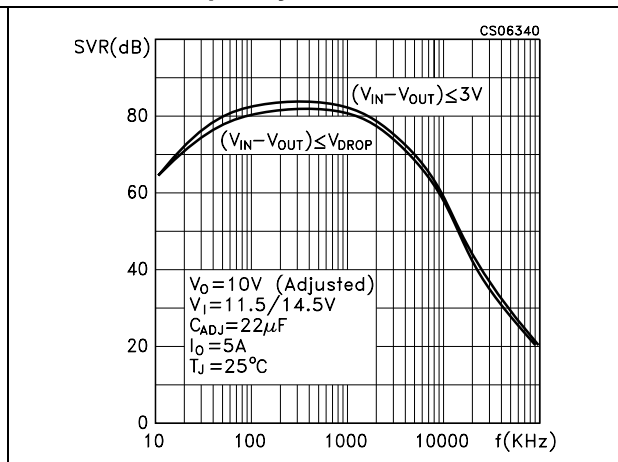


Figure 24. Stability

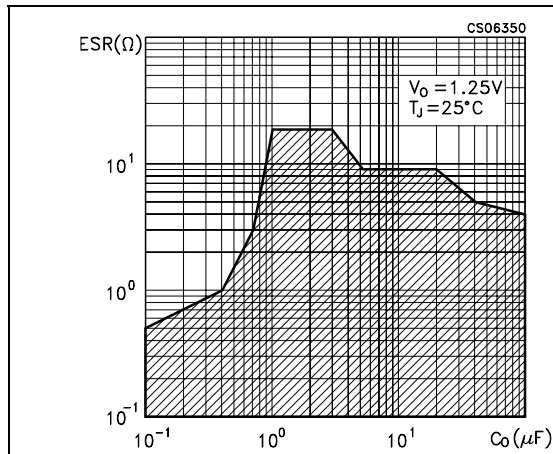


Figure 25. Supply voltage rejection vs. output current

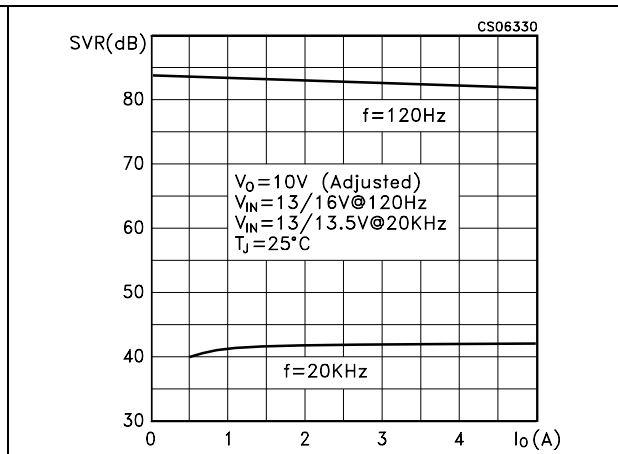


Figure 26. Stability

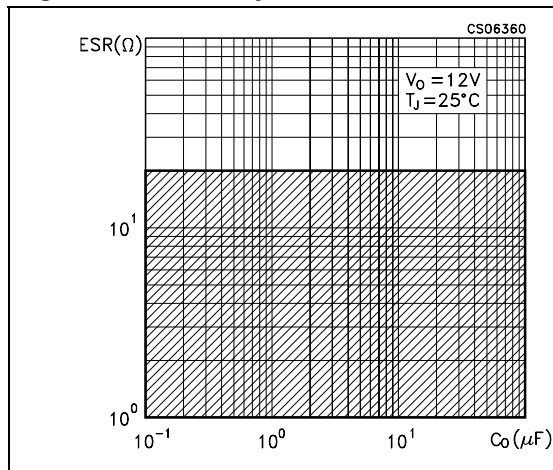


Figure 27. Line transient

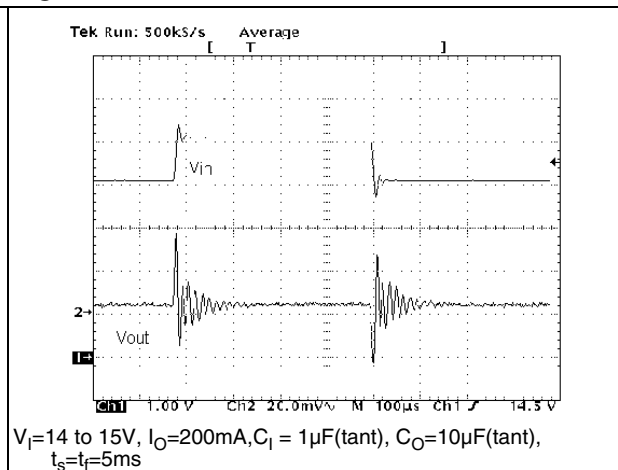


Figure 28. Line transient

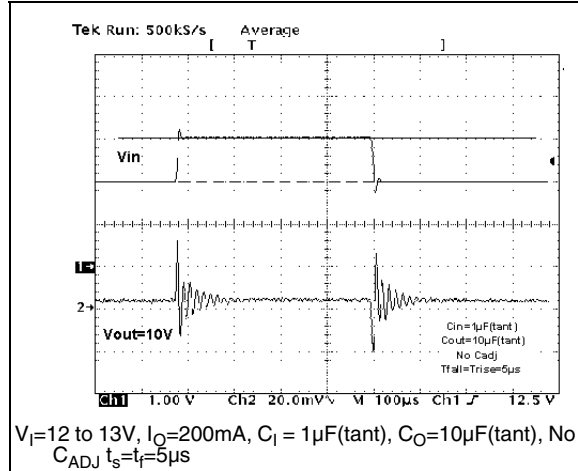


Figure 29. Load transient

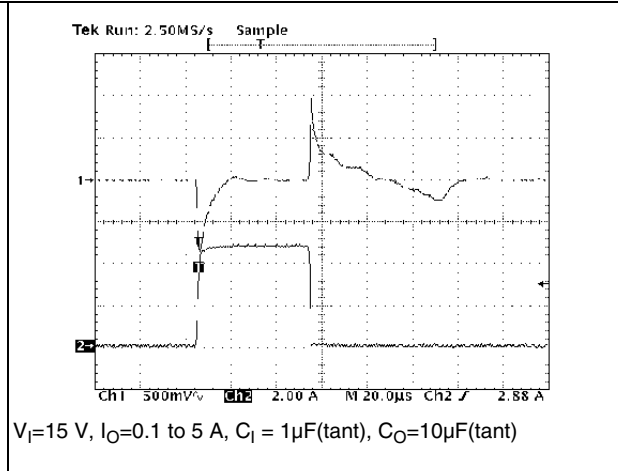


Figure 30. Load transient

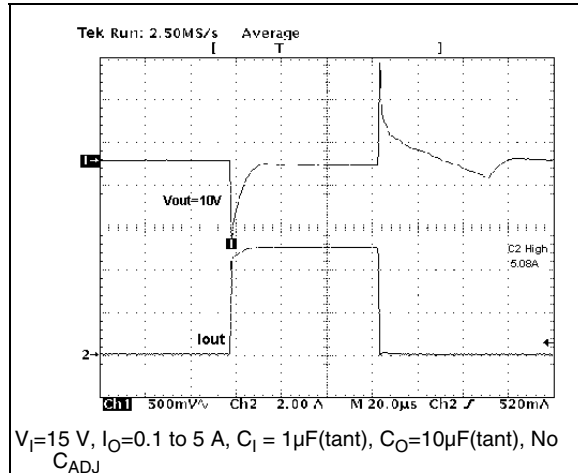


Figure 31. Line transient

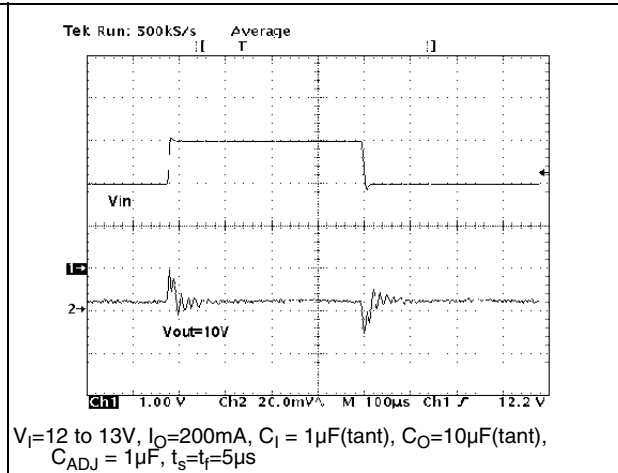
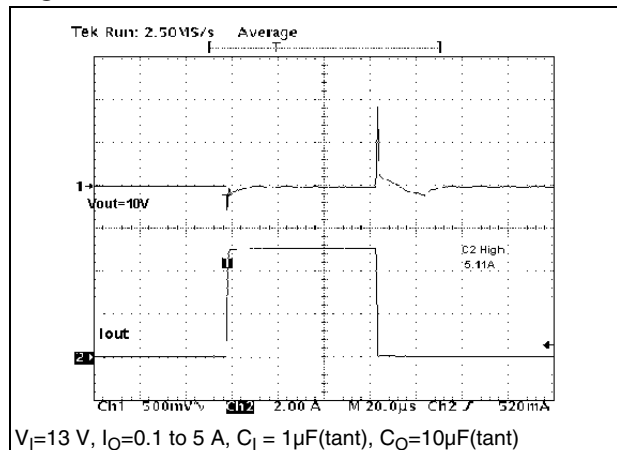


Figure 32. Load transient

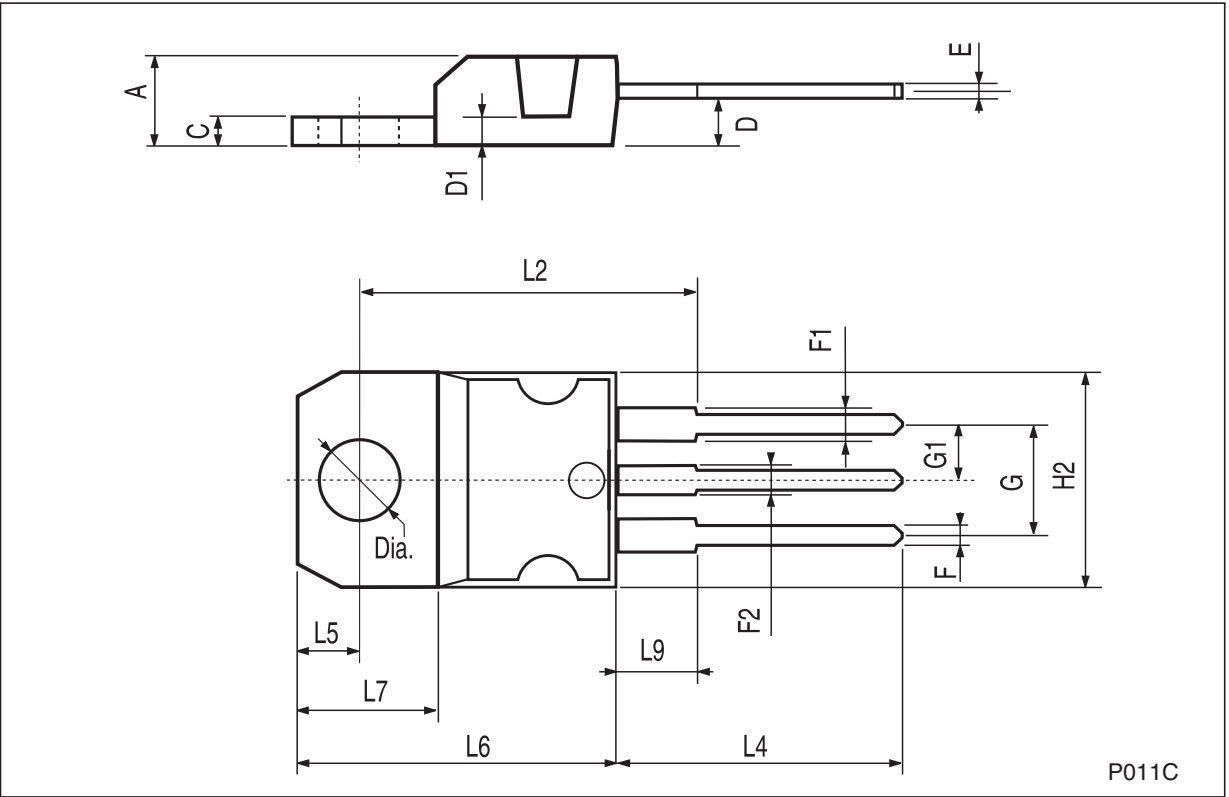


## 7 Package mechanical data

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TO-220 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



## 8 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
07-Oct-2004	3	Mistake order codes - Table 1.
08-Feb-2005	4	Mistake U.M. Load Regulation - V ==> mV.
16-Jun-2005	5	Order codes updated.
04-Apr-2007	6	Order code updated.
07-Jun-2007	7	Order codes updated.
08-Apr-2008	8	Modified: <a href="#">Table 1 on page 1</a> . Removed: packages D <sup>2</sup> PAK, D <sup>2</sup> PAK/A and mechanical data.
29-Jul-2009	9	Modified: <a href="#">Table 1 on page 1</a> .

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